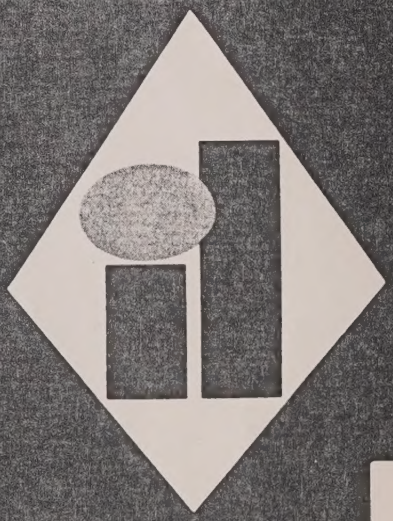
411

GENERAL INSTRUCTIONS



international light

MP MASTER
MA28469

GENERAL INSTRUCTIONS

IL411T PHOTORESIST PHOTOMETER

INTERNATIONAL LIGHT, INC.
12 Unicorn Street
Newburyport, Massachusetts
01950
(617) 465-5923

1.0 GENERAL INFORMATION

1.1 The IL411T Photoresist Photometer consists of a sensitive, transistorized, battery operated, control console and a remote near ultraviolet detector with its special response controlled to match the spectral sensitivity of photoresists.

1.2. The control panel consists of a readout meter, sensitivity selector switch with six ranges of sensitivity, zero control, and nine pin input connector.

1.3 The remote sensor assembly consists of a detector with sufficient response down to 300 mu in the near ultraviolet, an ultraviolet filter to isolated the ultraviolet region from 300 to 500 mu and a blocking filter to block out the secondary transmission band of the ultraviolet filter. This secondary transmission band occurs in the near infrared.

2.0 BATTERY TEST

2.1 The IL411T is battery operated for maximum portability and regulation to the circuitry. The mercury battery has an operating life of approximately one year. The battery should be tested from time to time to insure that its output is sufficient to maintain the accuracy of the unit. To test the battery turn the selector switch to the battery test position. If the reading on the panel meter is less than half scale, the battery should be replaced. To replace the battery remove the top shell from the instrument and unclip the battery from its position on top of the circuit board.

3.0 SENSITIVITY

3.1 The IL411T has six ranges of sensitivity for a dynamic range of 300:1. The most sensitive range is indicated by the .01 position and the least sensitive range is correspondingly indicated by the 3 position. These numbers on the sensitivity selector switch indicate the full scale value on the panel meter. The panel meter has two scales (0 to 100 and 0 to 30). By selecting the proper sensitivity scale it is never necessary to make a reading in the lower 30% of the scale.

4.0 MEASUREMENT PROCEDURE

4.1 Sensor - Console Connection: Before connecting the sensor to the console, place the sensitivity selector switch in the OFF position. The sensor is equipped with a 9 pin male connector. The pins are lettered to permit proper alignment with the female connector on the control panel.

4.2 Supplied with sensor are two reticles, one with a .5 inch aperature and one with a .187 aperature. When measuring intense sources, it is advisable to place the .187 reticle over the detector before switching the instrument ON. Always begin with the least sensitive ranges and switch towards the most sensitive ranges until the panel meter indicates better than 1/3 scale. When the proper range has been determined, cover the detector, and zero the panel meter by adjusting the Zero control knob. Uncover the sensor and make a reading.

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4.3 FOCUS AND ALIGNMENT:

To measure variations of intensity over a given area, select and position an aperture suitable for the area to be measured (a five to one ratio of exposure area to sensor area is appropriate). Place the sensing module in the area in question and move it about noting the change in deflection. The source may then be moved up, down, laterally, or rotated until movement of the sensor produces no change in deflection or maximum deflection, etc.

4.4 MERCURY VAPOR SOURCES

In many mercury vapor light sources, the mercury vaporizes relatively slowly. As the mercury vaporizes the ratio of ultraviolet light to visible light increases, and the meter reading will increase. For accuracy, the meter reading should be taken after the vaporization process has been allowed to reach equilibrium.

5.0 SPECTRAL RESPONSE AND CALIBRATION

5.1 The sensor assembly is filtered photo-detector designed to provide a spectral response from 300 millimicrons to 500 millimicrons with a peak response at 400 millimicrons. The following curve is a typical plot of spectral response verses wavelength. Provided with the curve is a calibration at 400 millimicrons for this particular sensor. The calibration factor provided (microwatts/cm^2 per scale unit) assumes a monochromatic source at 400 millimicrons.

5.2 EXAMPLE:

Calibration factor ..... $\frac{uw/cm^2}{\text{scale units}} = 10$

Intensity reading with
monochromatic source at
400 millimicrons 10

With the above values this source has an absolute radiant

intensity of 100 uw/cm^2.

6.0 MISCELLANEOUS

6.1 TEMPERATURE DEPENDENCE:

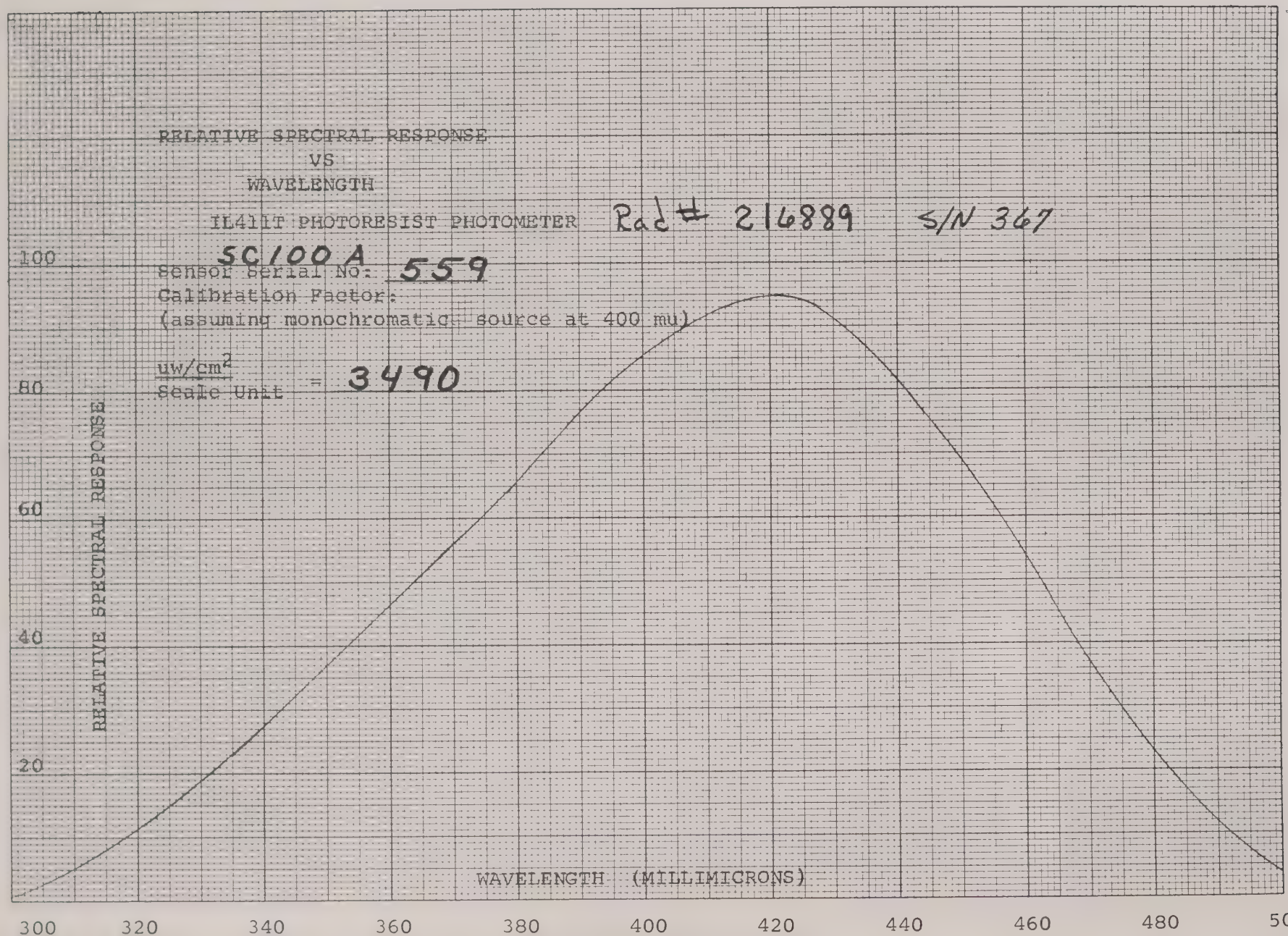
A 1^{o} F rise in temperature of the sensor element will produce a .05% increase in deflection. Optical filtering and insulation of the sensor element, however, make temperature effects non-existent or negligible under most conditions.

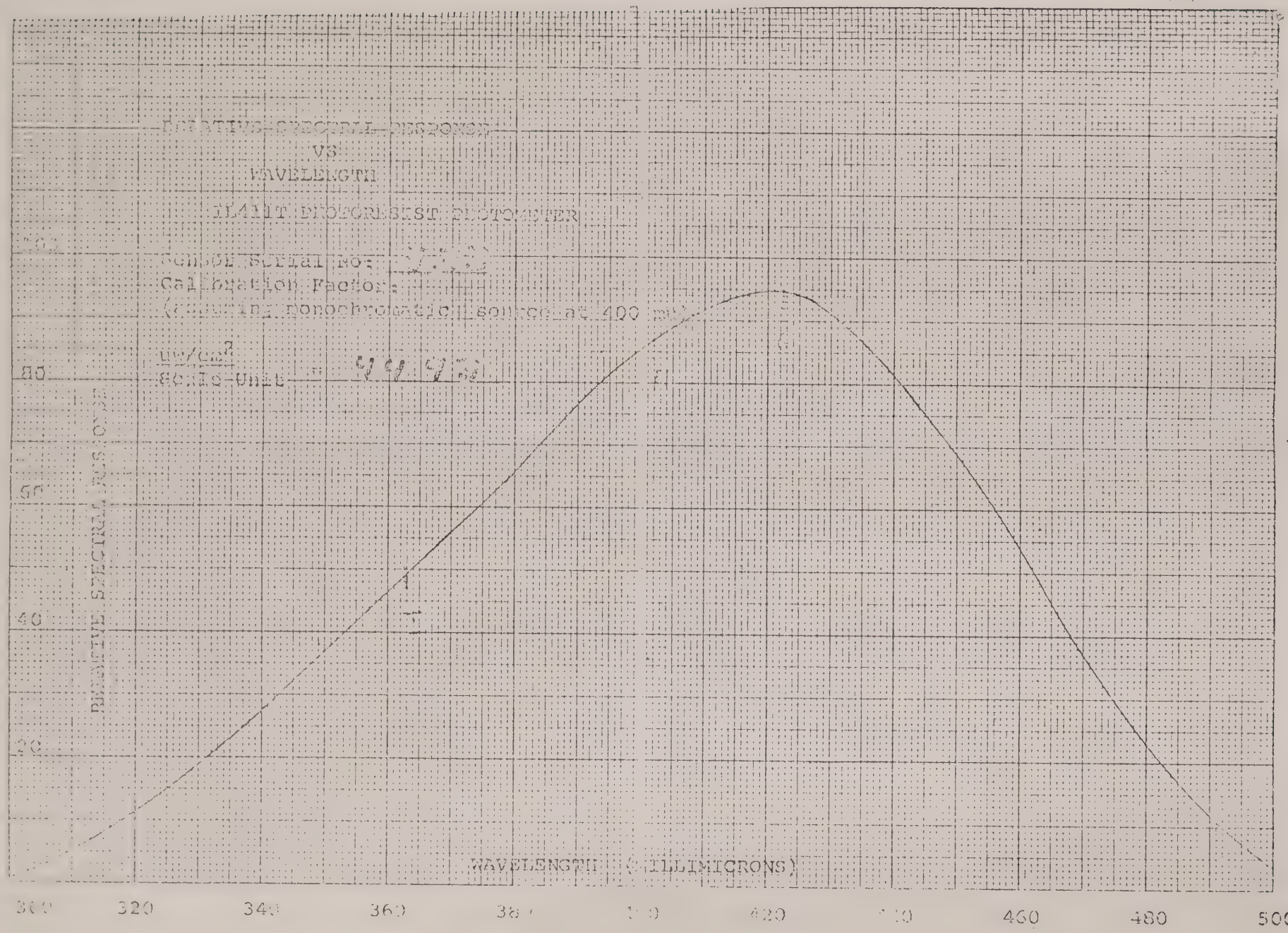
6.2 MAINTENANCE:

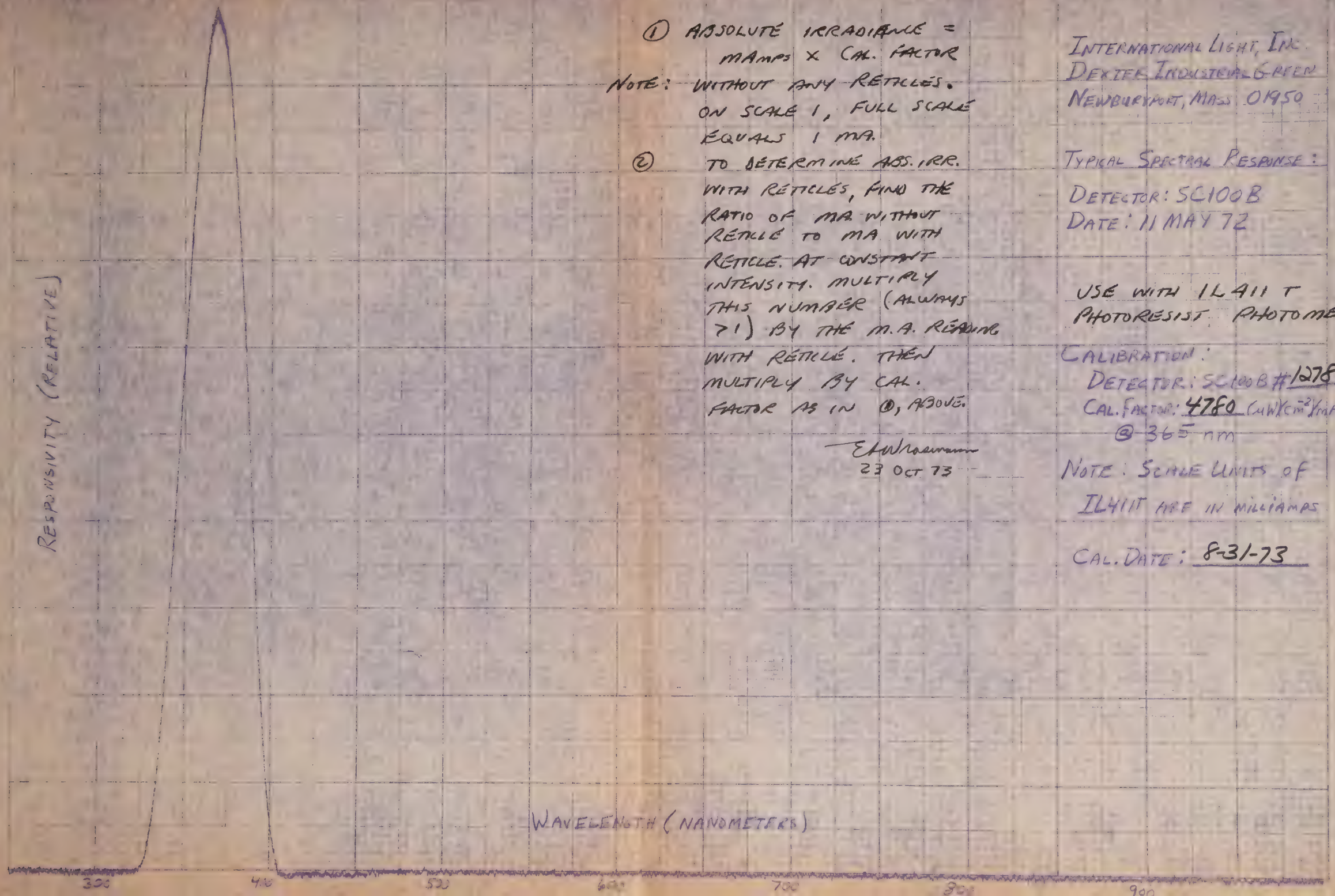
Unless subjected to extreme conditions of corrosion or temperature, the Model 411T meter should require no maintenance and should provide stable performance indefinitely. To clean the sensor it is recommended lens paper be used to avoid scratching the filter.

6.3 PARTS AND MODIFICATIONS:

International Light, inc. offers its services to perform any modifications that might be desired for special applications. Replacement parts are available from stock and may be ordered directly from the manufacturer.


RELATIVE SPECTRAL RESPONSE
VS
WAVELENGTH
IL411T PHOTORESIST PHOTOMETER
Rad # 216889
S/N 367
SC100A
Sensor Serial No: 559
Calibration Factor:
(assuming monochromatic source at 400 mu)
uw/cm²
Scale Unit = 3490
RELATIVE SPECTRAL RESPONSE
100
80
60
40
20
WAVELENGTH (MILLIMICRONS)
300
320
340
360
380
400
420
440
460
480
500


VS
WAVELENGTH
PLANT PROGRESS TEST PHOTOMETER
Sensor Serial No:
Calibration Factor:
(Calibrating monochromatic source at 400 mμ)
μw/cm²
Scale Unit
RELATIVE SPECTRAL RESPONSE
WAVELENGTH (MILLIMICRONS)
300
320
340
360
380
400
420
440
460
480
500



① ABSOLUTE IRRADIANCE = mAmps × CAL. FACTOR

NOTE: WITHOUT ANY RETICLES. ON SCALE 1, FULL SCALE EQUALS 1 mA.

② TO DETERMINE ABS. IRR. WITH RETICLES, FIND THE RATIO OF mA WITHOUT RETICLE TO mA WITH RETICLE AT CONSTANT INTENSITY. MULTIPLY THIS NUMBER (ALWAYS >1) BY THE M.A. READING WITH RETICLE. THEN MULTIPLY BY CAL. FACTOR AS IN ①, ABOVE.

E.A. Whalenmann
23 OCT 73

INTERNATIONAL LIGHT, INC.
DEXTER INDUSTRIAL GREEN
NEWBURYPORT, MASS. 01950

TYPICAL SPECTRAL RESPONSE:

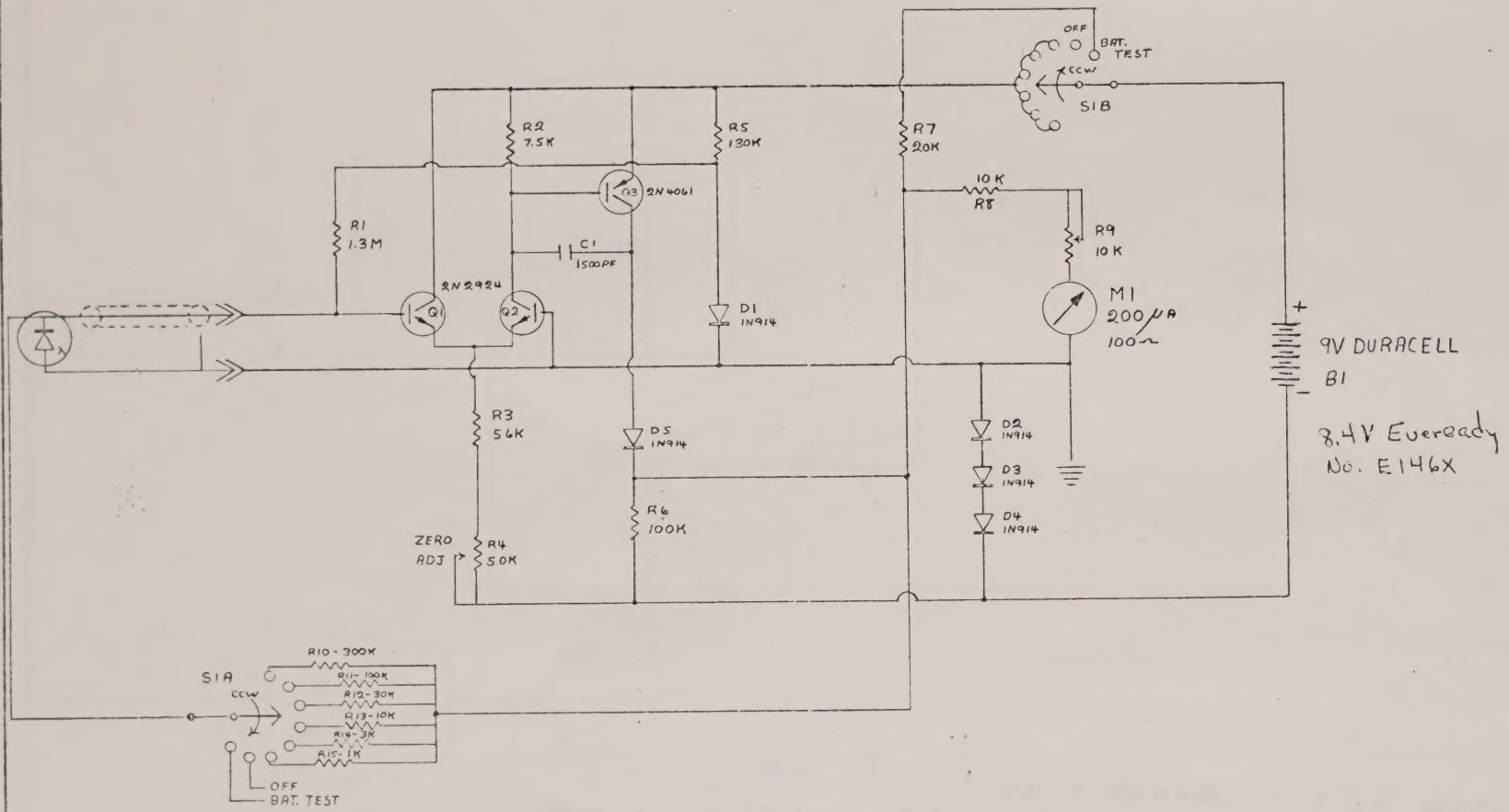
DETECTOR: SC100B
DATE: 11 MAY 72

USE WITH IL411T PHOTORESIST PHOTOMETER

CALIBRATION:
DETECTOR: SC100B #1278
CAL. FACTOR: 4780 ($\mu W cm^{-2} V^{-1} mA^{-1}$)
@ 365 nm

NOTE: SCALE UNITS OF IL411T ARE IN MILLIAMPS

CAL. DATE: 8-31-73

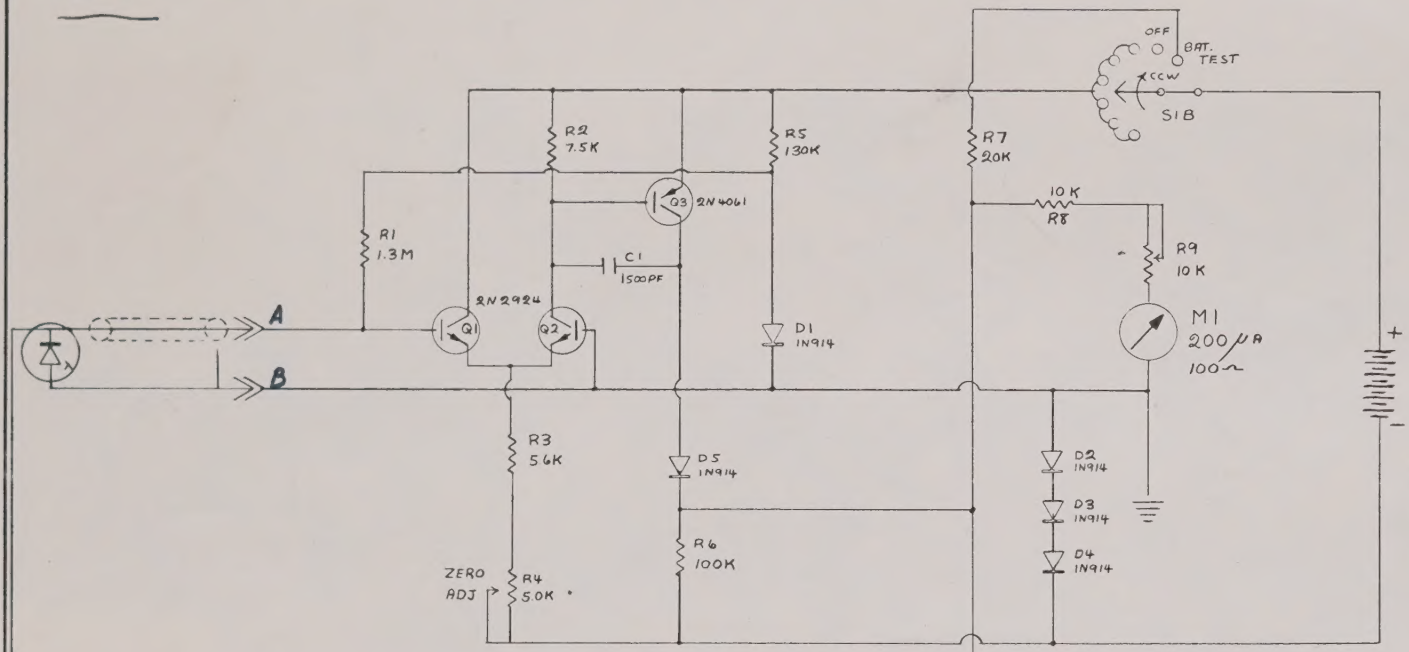


DATE	BY	REVISION RECORD	AUTH.	DR.	CK.

TOLERANCES (EXCEPT AS NOTED)	INTERNATIONAL LIGHT		
DECIMAL ±		SCALE	DRAWN BY PAP
			APPROVED BY PBL
FRACTIONAL ±	TITLE IL 411T CIRCUIT		
ANGULAR ±	DATE	DRAWING NUMBER 1117	

DAMAN.

DATE	BY	REVISION RECORD	AUTH.	CHK.	ENG.



8.4V Eveready No. E146X

10K 1%

−10V ——/\/\/\—— A

+10V ——— B

ON 1 RANGE = 1 MA Meter IND. F.S.

(3 of 3)

TOLERANCES (EXCEPT AS NOTED)	INTERNATIONAL LIGHT		
DECIMAL ±		SCALE	DRAWN BY P&P
			APPROVED BY PBL
FRACTIONAL ±	TITLE IL 411T CIRCUIT		
ANGULAR ±	DATE	DRAWING NUMBER 1117	

Ed Upstream
B-6 - Room 824 M/S6000

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